



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/785,067	02/25/2004	Eun Joo Jang	3811-0139P	8930
2292	7590	09/20/2005	EXAMINER	
BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747			NOVACEK, CHRISTY L	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 09/20/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

Office Action Summary

Application No.

10/785,067

Applicant(s)

JANG ET AL.

Examiner

Christy L. Novacek

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/25/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to the communication filed February 25, 2004.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: Claim 5 recites the limitation “wherein the surface of the nanocrystals is reduced or oxidized”. Claim 15 recites the limitation “nanocrystal having a chemically reduced or oxidized surface.” The specification does not provide support for the surface of the nanocrystal being oxidized.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 4, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 102

Art Unit: 2822

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 9 and 11-15 are rejected under 35 U.S.C. 102(e) as being anticipated by Dutta (US 6,906,339).

Regarding claims 1, 13 and 15, Dutta discloses surface-treating semiconductor nanocrystals with a reducing agent (col. 4, ln. 29-62).

Regarding claim 2, Dutta discloses that the semiconductor nanocrystals are synthesized by a wet chemistry method (col. 5, ln. 35-45).

Regarding claim 3, Dutta discloses that the semiconductor nanocrystals can be core-shell nanocrystals made of CdS, ZnS, CdSe, ZnSe, ZnTe, CdTe, GaN, GaP, InP or InAs (col. 4, ln. 29-41).

Regarding claim 4, Dutta discloses that the reducing agent can be a solution of hydrogen sulfide or ammonia (col. 4, ln. 42-55; col. 7, ln. 35-45).

Regarding claim 9, Dutta discloses that the surface treatment of the nanocrystals can be carried out at 0-100°C (col. 7, ln. 67).

Regarding claim 11, Dutta disclose that the nanocrystals can have a spherical shape (Fig. 1).

Regarding claim 12, Dutta discloses that the nanocrystals can have a size of 2-100 nm (col. 4, ln. 10-20).

Art Unit: 2822

Regarding claim 14, Dutta discloses that the semiconductor nanocrystals may be incorporated into a luminescent layer in an organic electroluminescent device, an OLED, which inherently includes a plurality of organic and inorganic layers (col. 12, ln. 32-48).

Claims 1, 3, 4, 10-13 and 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Simpson et al. (US 6,853,669).

Regarding claims 1, 13 and 15, Simpson discloses surface-treating semiconductor nanocrystals with a reducing agent (col. 4, ln. 29-62).

Regarding claim 3, Simpson discloses that the semiconductor nanocrystals can be core-shell nanocrystals made of ZnS or CdSe (col. 10, ln. 44-52).

Regarding claim 4, Simpson discloses that the reducing agent can be a reducing gas of hydrogen (col. 16, ln. 1-34).

Regarding claim 10, Simpson discloses that the surface treatment is carried out for about an hour (col. 16, ln. 1-11).

Regarding claim 11, Simpson discloses that the nanocrystals have a spherical shape (Fig. 3).

Regarding claim 12, Simpson discloses that the nanocrystals can have a size anywhere in the nanometer range (col. 15, ln. 55-58).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

Art Unit: 2822

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dutta (US 6,906,339) in view of Rockenberger et al. (US 6,878,184).

Regarding claims 5-7, Dutta does not disclose that the nanocrystals are coordinated by an organic dispersant and dispersing the nanocrystals in a solvent having an affinity with the dispersant. Like Dutta, Rockenberger discloses forming nanocrystals. Rockenberger teaches that it is advantageous to form the nanocrystals such that they are coordinated by an organic dispersant of carboxylic acid, such as oleic acid, and dispersing the nanocrystals in a solvent having an affinity with the dispersant because the dispersant can control the size and solubility of the nanocrystals (col. 3, ln. 1-39). At the time of the invention, it would have been obvious to one of ordinary skill in the art to form the nanocrystals such that they are coordinated by an organic dispersant of carboxylic acid, such as oleic acid, and dispersing the nanocrystals in a solvent having an affinity with the dispersant because the dispersant can control the size and solubility of the nanocrystals.

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dutta (US 6,906,339).

Regarding claim 8, Dutta does not disclose the ratio at which the nanocrystals and reducing agent are mixed. At the time of the invention, it would have been obvious to one of ordinary skill in the art to use routine experimentation to determine an optimal nanocrystals to reducing agent ratio of the mixture of Dutta, depending upon the material of the nanocrystal and

Art Unit: 2822

material of the reducing agent because such variables of art recognized importance are subject to routine experimentation and discovery of an optimum value for such variables is obvious. See *In re Aller*, 105 USPQ 233 (CCPA 1955).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Kauzlarich et al. (US 6,855,204) disclose forming semiconductor nanocrystals and surface-treating them with a reducing agent.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (571) 272-1839. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

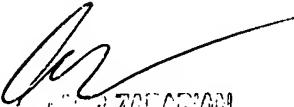
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Art Unit: 2822

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLN

September 19, 2005


AMIR ZAFARIAN
TECHNICAL EXAMINER
TECHNICAL CENTER